

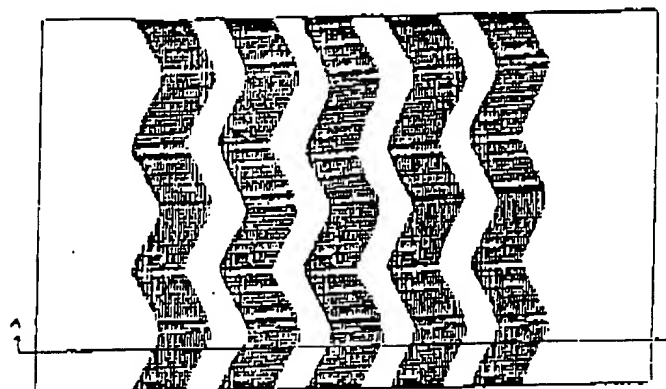
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: CLEANING CLOTH



## (57) Abstract

Repeated use cleaning cloth for wet cleaning and dry dusting and/or polishing consisting of a textile skeleton and plural fields with loops or pile alternating with loop-free fields at which the fibre material in the textile skeleton and the loops consists of the same or different kinds of fibers chosen among natural, regenerated and synthetic fibers, which may be antistatic, anistat-treated or impregnated with cleaning compositions and/or compositions which increase the dust absorption, anistatic and/or polishing effect. The limiting lines between loop-covered and loop-free areas are at least partly curved i.e. their tangent forms an angle along the cloth varying angle with the length-axis of the cloth. The cloth shows improved dirt-catching effect and less tendency to leave local dirt accumulations behind

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Cleaning cloth

The invention applies to a woven, knitted or in other known way manufactured cloth consisting of a textile skeleton and from it protruding pile or loops.

Cleaning cloths of similar kinds are known from among others the Swedish laid open patent applications No 451 426 (8500992-6) and No 431 158 (8004718-6).

The cloth according to the Swedish laid open patent application No 451 426 has a crocheted skeleton made of artificial fibers and loops made of cotton thread at just one side. The loops are located in more than one parallel rows with loop-free intermediate areas. The aim of the intermediate loop-free areas are to make the cloth lighter, easier to handle and to increase its ability of sliding over the surfaces that are to be cleaned.

The cloth according to the Swedish laid open patent application No 431 158 is woven and has loops at both sides. The layer of loops at the upper side is considerably tighter than at the lower side. The intention is that the cloth shall be used impregnated with a cleaning composition at which the layer of loops at the upper side will serve as a reservoir for the cleaning composition.

This invention applies to a cleaning cloth intended to be used repeatedly and consisting of a textile skeleton at one side provided with loops that can be cut and form a pile. In the following the term loops will be used both for un-cut loops and pile. The loops are located in more than one areas with loop-free intermediate areas. In contrast to the earlier known cloth (laid open application No 451 426) the limits between the loop-covered and loop-free areas consist at least partly of curved lines, i.e. lines with a tangent which forms an angle along the cloth varying angle with the length-axis of the cloth. In the term curved lines is included the case where the lines bend in such a way that a more or less sharp angle is formed between the line branches.

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The curved lines may have transversal waveform and limit parallel fields with constant width of loop-covered and not loop-covered areas. This is the most uncomplicated way of manufacturing. Within the framework of the invention lies, however, to let the width of the fields vary and to let the limit lines of the fields consist of mixed waveforms, where amplitude and/or wave length changes along the fields. Other possibilities are circles, helices etc. Within the framework of the invention too is to let straight fields alternate with waveformed or in other ways curved fields.

A preferred use of the cloths according to the invention is as a covering of mops and other similar cleaning implements at which the cloth is arranged with the length-axis of the fields perpendicular to the principal direction of movement of the mop. The coverings may be pre-moistened, eventually with simultaneous impregnation with a cleaning composition, moistened at the use or used dry for dusting off.

Another preferred use of the cloths according to the invention is as a hand or implement hold cloth for dusting and/or polishing eventually impregnated for increasing the dust sorption, antistat and/or polishing effect.

Dirt and dust are as a rule not evenly distributed on the surfaces that are to be cleaned. Earlier types of cleaning cloths gives local accumulations of dirt, which tend to break through and be left after cleaning with the result that the work must be redone. This applies to the cloth according to laid open application No 451 426 too.

The loop-free fields form channels, which let the dirt distribute itself along the cloth. If the channels are principally perpendicular to the main direction of movement of the mop this redistribution is made impossible as the power that is caused by the friction of the dirt against the floor is directed at right angle against the row of loops and lacks lateral components. Cleaning cloths according to the invention give a lateral power component, which makes the dirt particles move along the row of loops. This decreases the danger of break through and increases the probability that the dirt particles will be

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caught by and permanently kept by the thread loops until the cleaning cloth will be cleaned by washing or in other known ways.

The description above is concerned with the case where the fields of loops and loop-free areas run in the length direction of the cloth. It is easily observed that comparable advantages can be achieved with the other patterns that are mentioned above. At the use as mop cloth should, however, at least one of the loop-covered fields run continuously from one end of the cloth to the other.

The Swedish laid open patent application No 364 438 (14065/71) describes a single use mop cloth consisting of a paper foundation with glued on coarse cotton threads which may have zigzag or waveform. This is however not a preferred pattern and there is nothing in the mentioned publication that could lead to the conclusion that the wave-form might contribute to any improvement of the cleaning efficiency.

This is, in fact, probably not the case as the compact form, in comparison with the relatively open system formed by the thread loops, of the cotton threads makes the catching effect minimal. One would therefore more likely expect an increased tendency to accumulation of dirt and break through at the backwards directed tips of the pattern.

This tendency is reinforced as one has to use twisted yarns to get enough fluffiness without reducing the strength too much. The space between the yarn parts will form a transport channel for dirt across the yarn. In the case where the threads are straight this channel will be long and mainly side-directed. In the case of wave-formed threads the channel will be short and directed across the threads.

As mentioned above the cloth can be manufactured in many different ways. It is however preferred to produce it by weaving with the same technique which are used for making Turkish towel. Weaving gives a cloth that is light, strong, form-stable and easily handled and adaptable for different areas of use. The cloth can easily be folded over a plastic plate or another fitting mop-implement and be fixed by clips or in other known ways.

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Another preferred method of manufacturing has been proposed relatively lately and shows features from the known technics of knitting and weaving. It can be described in the following way: columns of chain-stitches, which form loops too, are used as warp and kept together by transversal weft-threads. Cloths produced with this method shows the same advantages as woven towel cloths and can be produced in a more uncomplicated and economical way with bigger flexibility regarding choice of material, pattern etc.

The length and density of the loops may be varied within wide limits for instance from 1 to 20 mm preferably 2 to 10 mm length and from 5 to 40 loops per centimeter preferably 10 to 30 loops per centimeter.

The ratio between the areas of loop-covered and loop-free surfaces within the surface that is used for cleaning may vary from 9:1 to 1:9. However, for most purposes it is to be preferred that the part of loop-covered areas is the bigger one, ratios between 8:2 to 6:4 are preferred. Dependent on the intended area of use the cloth should be provided with a loop-free area with enough width outside the proper cleaning surface too to make it easy to fold over and fix to the intended cleaning implement. In this connection the cleaning surface is defined as the area that are limited by the outside limit lines of the outermost loop-covered fields.

If wave lines are used as pattern for the limiting lines their amplitude should not be too large. In preferred designs the amplitude is less than the wavelength, as a rule less than half the wavelength and especially less than about a fourth of the wavelength. The wave lines may run mainly parallel or be up to one half wavelength displaced in relation to each other.

Some examples of preferred designs are shown in fig. 1 to 4, where

fig. 1. is a computer generated drawing of part of the cleaning surface of a cloth with five wave-formed, parallel, loop-covered fields with the same fibre material in all fields together with a section through the cleaning cloth along the line A - A,

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fig. 2 is a computergenerated drawing of part of the cleaning surface of a cloth with five wave-formed, loop-covered fields, dislocated half a wave-length in relation to each other,

fig. 3. is a computergenerated drawing of part of the cleaning surface of a cloth with five loop-covered fields limited by wave lines, which have been dislocated half a wavelength in relation to each other,

fig. 4. is a computergenerated drawing of part of the cleaning surface of a cloth with three loop-covered fields with loops with mainly dirt-catching effect and limited by wave lines which have been dislocated half a wavelength in relation to each other and two straight fields where the loops are made of material with mainly scouring effect together with a section along the line A - A through such a cleaning cloth.

The drawings show five loop-covered and four loop-free fields but these numbers may of course vary between wide limits for instance from 2 to 25 loop-covered fields and from 1 to 24 loop-free fields dependent upon among others the width of the cloth. It should, however, be observed that either the loop-covered or the loopfree fields should be too narrow as the danger of break through then increases. A lower limit of about .5 centimeter respectively .1 centimeter is as a rule appropriate. Usual dimensions appropriate for most areas of use are from 1 to 5 centimeter respectively from .5 to 2 centimeter. The lower and upper limit applies mainly to the cases where the width of the loop-covered and/or the loop-free fields is varying along the cloth.

The material of warp and weft may be varied. Natural fibres, especially cotton, regenerated fibres and artificial fibres may be used. The same or different kinds of fibres may be used in warp and weft in different parts of the cloth. A preferred combination is warp, which also form loops, of textured synthetic fibres especially polyester fibres and weft of cotton.

In another preferred mode both warp and weft are of the same kind of fibres for example cotton, regenerated or synthetic fibres. for cleaning

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ning without water of surfaces and/or areas where problem with static electricity can be expected use of fibres or fibre mixtures treated to give temporary or permanent antistatic properties, for example MERAK-LON-fibres is recommended.

In a especially preferred mode the warp threads are changed systematically in such a way that one gets loop fields with pronounced dirt catching effect alternating with loop fields with mainly scouring effect. An interesting variety of this is a scouring cloth with an uneven number for example five, longitudinal, wave formed loop fields, where the fields with uneven numbers have mainly dirt catching effect whereas the fields with even numbers have mainly scouring effect.

Scouring effect can be achieved for example by the use of more rigid fibres with larger cross section area and abrasive strength such as drawn monofilament fibres of nylon or other fiber materials with high wear strength and low water absorption.

Within the framework of the invention lies, however, to use sewed on or in other ways to the textile skeleton attached stripes of scouring material produced with other methods. Example of such stripes are ribbons consisting of foamed plastic with coarse pore system and eventually containing filling materials which increase the abrasive effect too, crocheted monofilament of different thermoplastics or rubber with rough surface or bristles eventually containing abrasives.

The whole cloth may be one-coloured. However, the production method makes it easy to vary colours and design. Beside decorative purposes this may with advantages be used as means to code the cloths for different areas of use.



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## Patent claims

1. Repeated use cleaning cloth for wet cleaning and dry dusting and/or polishing consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields whereby the fibre material in the textile skeleton and the loops consist of the same or different kinds of fibres chosen among natural, regenerated and synthetic fibres, which may be antistatic, antistat-treated or impregnated with cleaning compositions and/or compositions which increase the dust absorption, antistatic and/or polishing effect characterized in that the limiting lines between loop-covered and loop-free areas are at least partly curved to give a lateral power component which makes the dirt particles move along the loop-row which reduces the danger of break through and increases the probability that the dirt particles will be caught by and permanently held by the loops.

2. Repeated use cleaning cloth according to claim 1 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that the limiting lines between loop-covered and loop-free areas are curved in such a way that a wave-formed pattern is obtained.

3. Repeated use cleaning cloth according to claim 2 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that the limiting lines between loop-covered and loop-free areas are curved in such a way that the waveformed pattern will consist of plural parallel fields.

4. Repeated use cleaning cloth according to claim 2 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that the limiting lines between loop-covered and loop-free areas are curved in such a way that the waveformed pattern will consist of plural fields and where the fields are dislocated up to one half wavelength in relation to each other.

5. Repeated use cleaning cloth according to claim 2 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that the limiting lines between

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loop-covered and loop-free areas are curved in such a way that the waveformed pattern will consist of plural fields and where the fields are dislocated up to one half wavelength in relation to each other and with the limiting lines dislocated in relation to each other to make the width of the loop-covered and/or loop-free fields vary along the cloth.

6. Repeated use cleaning cloth according to claim 2 to 5 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that waveformed fields alternate with straight fields.

7. Repeated use cleaning cloth according to claim 1 to 6 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that fields with mainly dirt-catching effect alternate with fields with mainly scouring effect.

8. Repeated use cleaning cloth according to claim 7 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that fields with mainly dirt-catching effect alternate with fields with mainly scouring effect at which the fields with mainly dirt-catching effect have uneven numbers and the fields with mainly scouring effect have even numbers counted from the outer edge of the cloth.

9. Repeated use cleaning cloth according to claim 1 to 8 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that the weft of the textile skeleton wholly or partly consists of cotton and the loopfields at least partly of textured synthetic fibres, preferably polyester fibres.

10. Repeated use cleaning cloth according to claim 1 to 6 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that the cloth at least partly consists of antistat-treated fibres.

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11. Repeated use cleaning cloth according to claim 1 to 9 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that it has been impregnated with a cleaning composition or compositions which increases its dust absorption, antistat and/or polishing effect.

12. Repeated use cleaning cloth according to claim 1 to 8 consisting of a textile skeleton and plural fields of loops or pile alternating with loop-free fields characterized in that the ratio between the total area of loop-covered fields and the total area of loop-free fields is between 9:1 and 1:9, preferably between 8:2 and 6:4.

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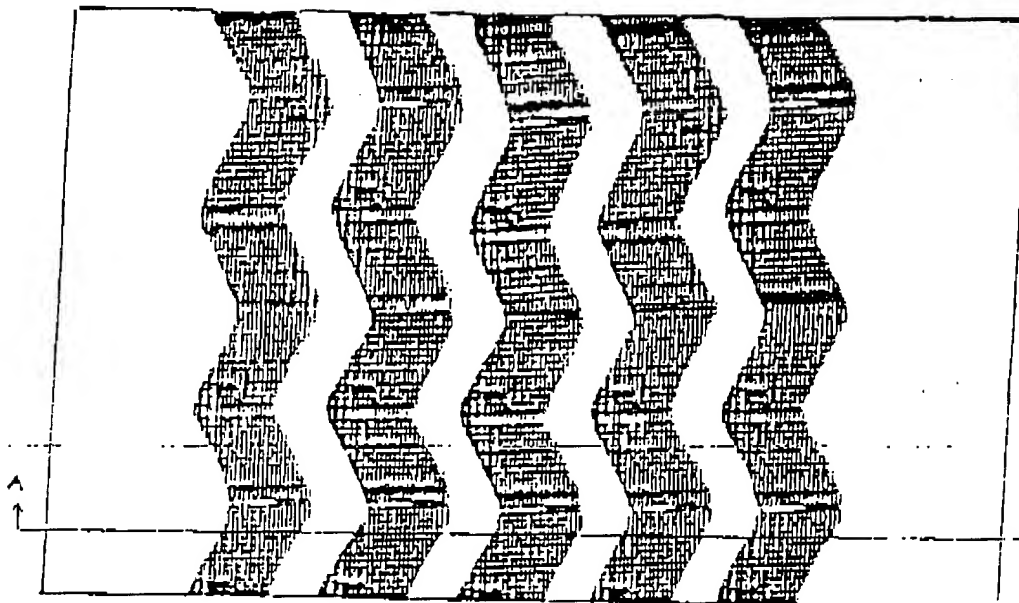


Fig. 1

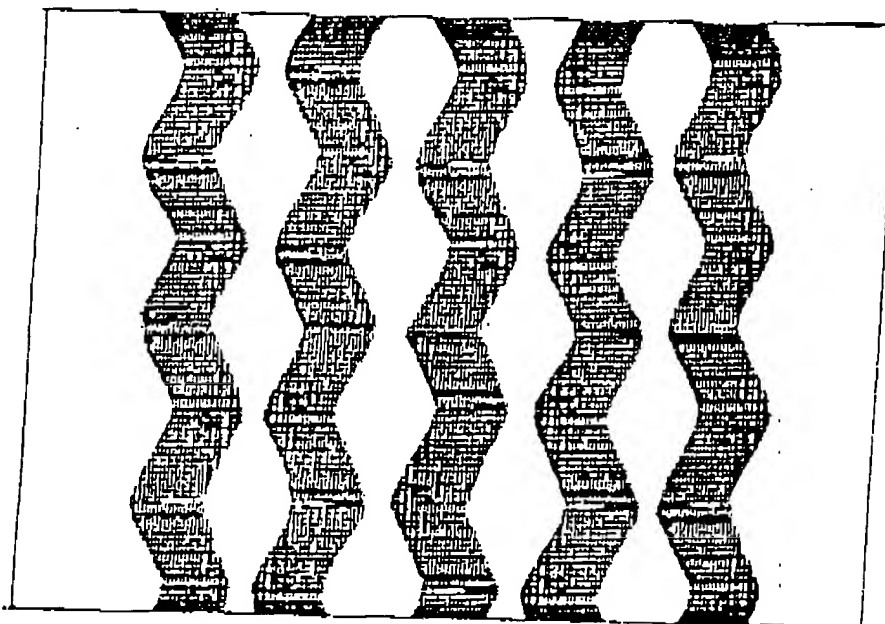


Fig. 2

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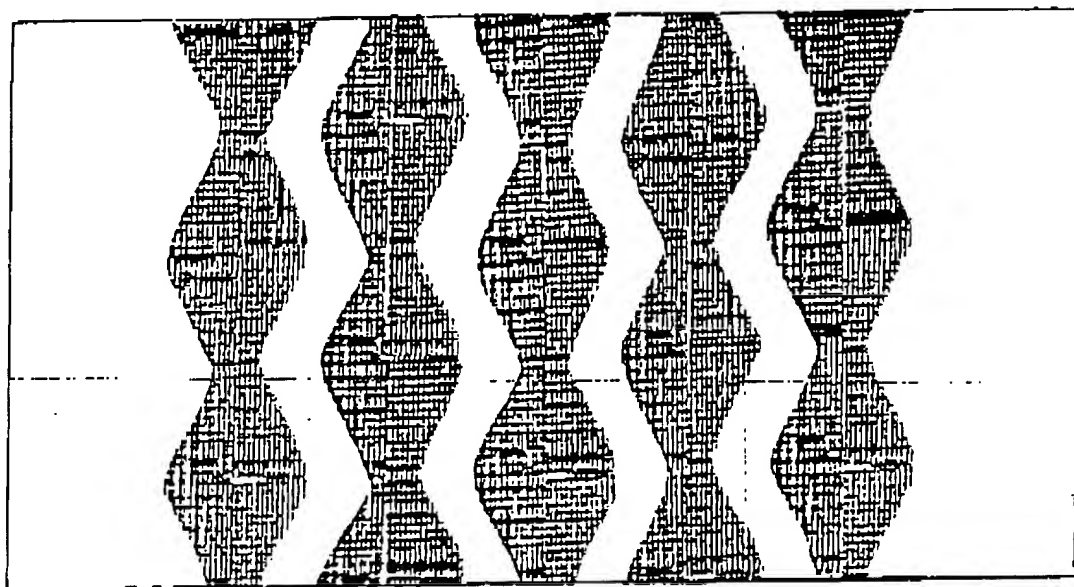


Fig 3

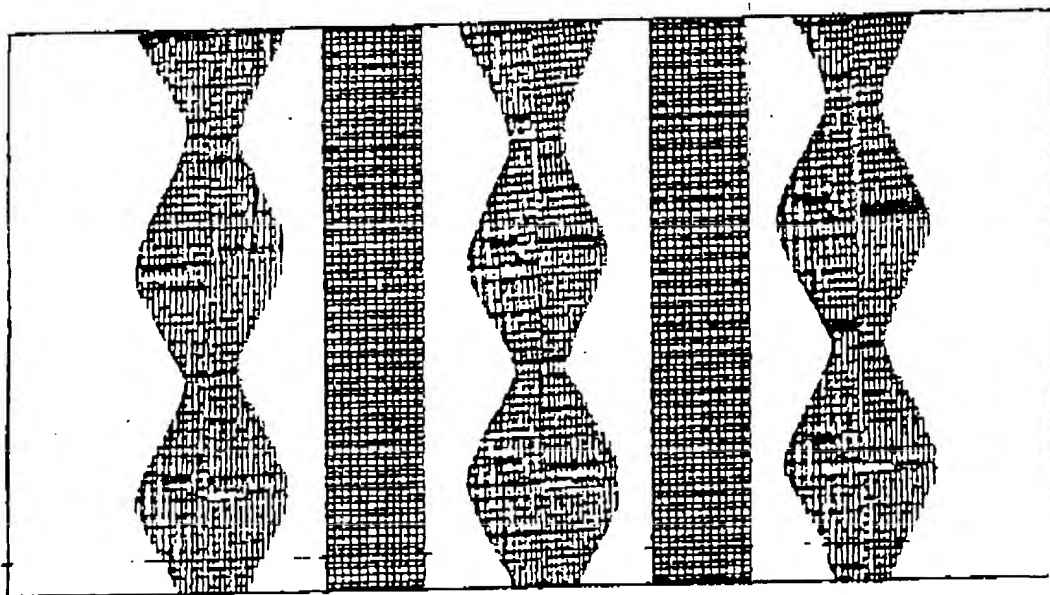


Fig. 4

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## INTERNATIONAL SEARCH REPORT

International Application No. PCT/SE 90/00337

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) <sup>1</sup> According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC5: A 47 L 13/16		
II. FIELDS SEARCHED		
Minimum Documentation Searched <sup>2</sup>		
Classification System	Classification Symbols	
IPC5	A 47 L	
Documentation Searched other than Minimum Documentation to the extent that such documents are included in Fields Searched <sup>3</sup>		
SE, DK, FI, NO classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>4</sup>		
Category <sup>5</sup>	Citation of Document <sup>6</sup> with indication, where appropriate, of the relevant passages <sup>7</sup>	Relevant to Claim No. <sup>8</sup>
A	WO, A1, 8605082 (BENGTSSON STURE) 12 September 1986, see figure 1; claim 1	1
A	SE, B, 364438 (N G G GUSTAFSSON) 25 February 1974, see figure 3	1
<p><sup>9</sup> Special categories of cited documents: <sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"Z" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
30th July 1990	1990-08-09	
International Searching Authority	Signature of Authorized Officer	
SWEDISH PATENT OFFICE	Björn Salén <i>Björn Salén</i>	

Form PCT/ISA/210 (second sheet) (January 1985)

ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. PCT/SE 90/00337

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 90-06-27. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A1- 8605082	86-09-12	AU-D- 5581886	86-09-24
		EP-A-B- 0250429	88-01-07
		SE-B-C- 451426	87-10-12
		SE-A- 8500992	86-08-29
SE-B- 364438	74-02-25	NONE	